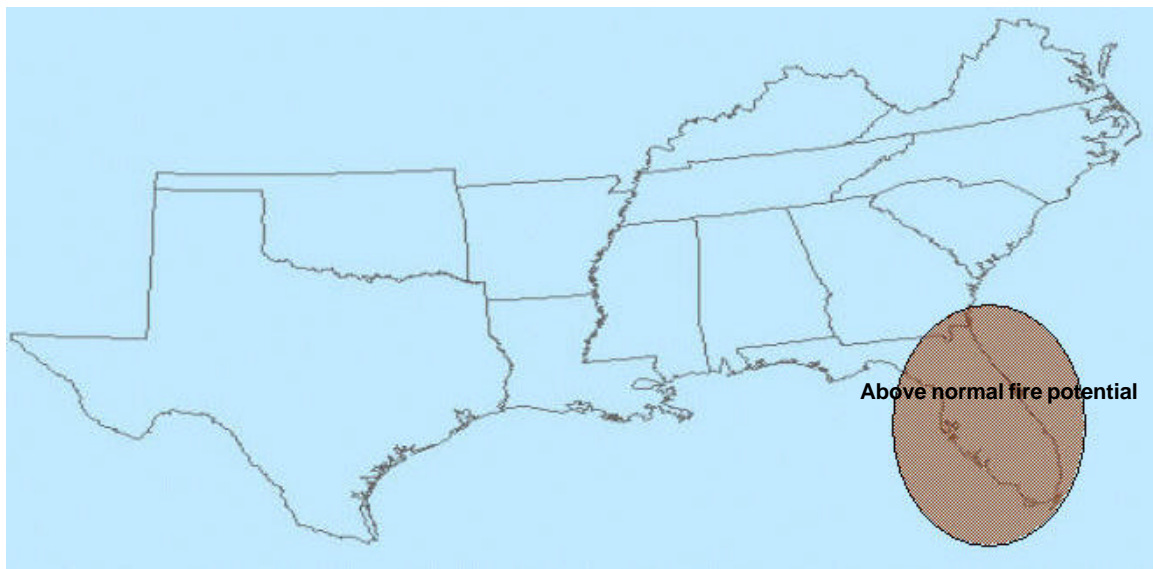


# **Seasonal Fire Weather/Fire Danger Outlook Southern Area January 21, 2005**

## **A. EXECUTIVE SUMMARY**

No significant long-term trends for wide spread dry conditions are evident. However, there are currently pockets of drier than normal areas in Florida, Texas and the Carolinas. This, combined with the large amount of increased fuel loading due to hurricane damage produces several areas of concern for the current fire season. At this time, the Florida peninsula is the only area predicted to have above normal fire potential. This is due to the large amount of fuel loading due to storm damage and the below normal amounts of precipitation forecasted during the fire season. Our confidence in this assessment is moderate to high. This outlook was developed at the Southern/Eastern Area Assessment Workshop held at the National Conservation Training Center during the week of January 18, 2005. The list of participants is available in the workshop proceedings.

## **Fire Potential Forecast for 2005**

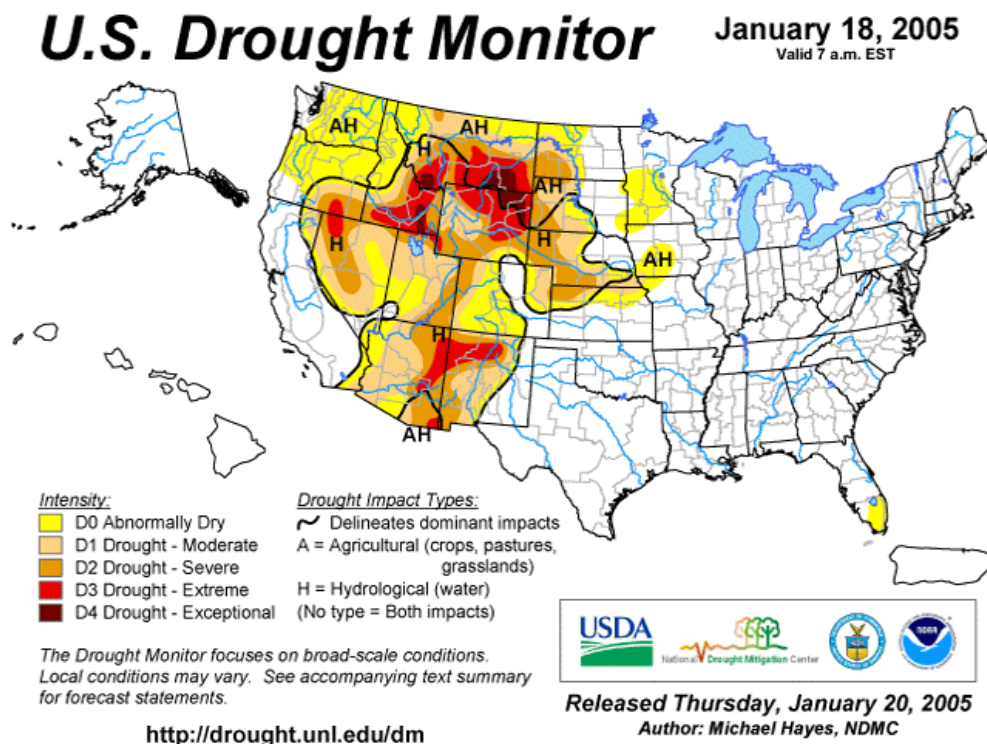


## B. CURRENT CONDITIONS

With very few exceptions, the last year has seen normal to above normal rainfall in all parts of the Southern region. One of the major weather influences during the past year was an unusually active tropical season that saw four major hurricanes make landfall in Florida and the Gulf Coast. These storms brought copious amounts of rainfall to the peninsula of Florida, Alabama, Georgia, the Carolinas, and other Southern states to a lesser degree. The early winter and fall seasons also brought a persistent weather pattern that spawned several slow-moving low pressure systems that brought widespread rainfall to Texas, Louisiana, and Arkansas. Maps presented below showed various drought indices, rainfall anomalies, and subjective analyses of moisture conditions in recent months and over the last year.

### U.S. Drought Monitor

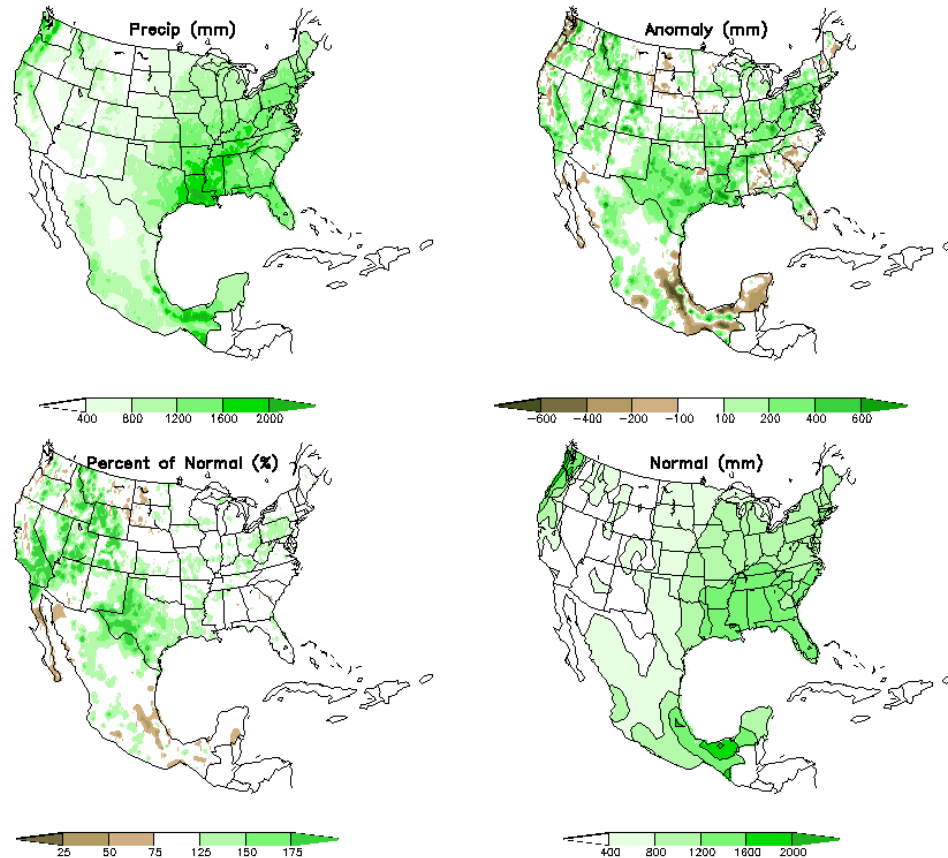
The *U.S. Drought Monitor* is a national product that attempts to designate areas with various degrees of drought concerns by a combination of objective and subjective analyses. As a first look, the *U.S. Drought monitor* shows the entire Southern Region, with the exception of South Florida, as free from drought. In fact, the Southern Region has been relatively drought-free over the last 12 months with only minor, short-lasting exceptions.



### ***Precipitation Surplus/Deficits***

The figures below take a closer look at recent precipitation in terms of percent of normal. The 12-month anomalies are indicative of long-term moisture. The entire Southern region is consistently normal to above normal.

365-day accumulation ending 20050119

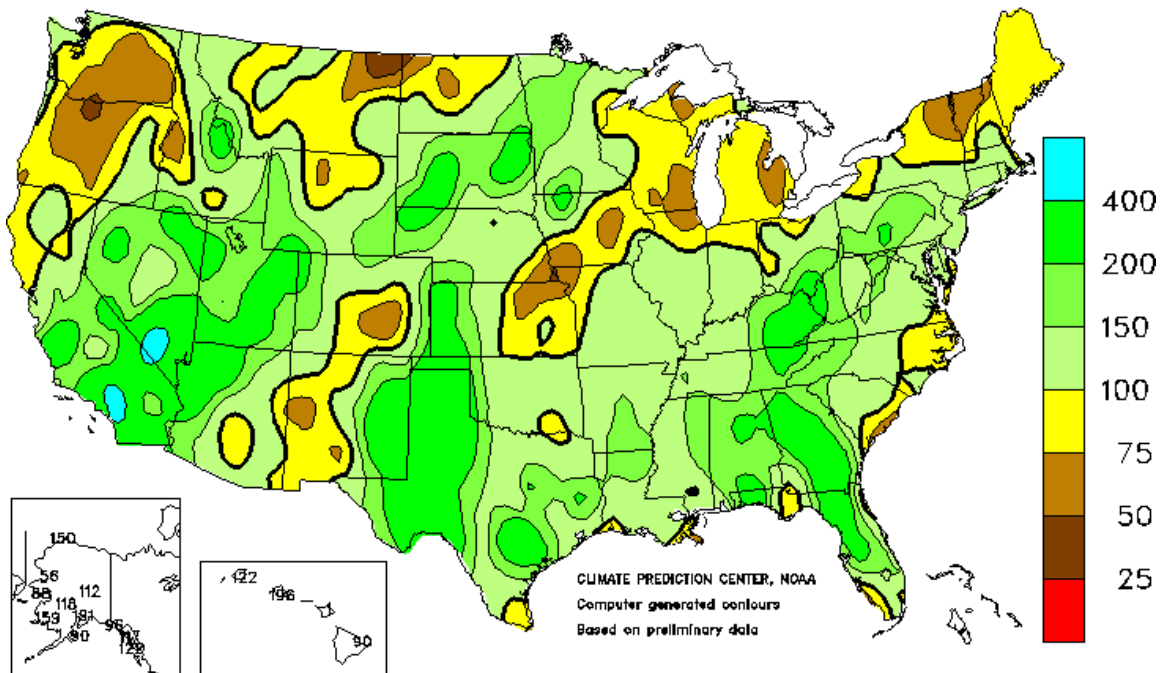


More recently, the 90-day anomalies highlight the tropical rainfall in Florida, Georgia, and Alabama with large areas indicating over 200% of normal over most of the area. The rainfall surplus in west Texas is also apparent.

The 30-day precipitation analysis for December of 2004 shows short-term rainfall deficits beginning to affect the Southern Region. These short-term deficits are of little concern to most of the region, where low winter evapotranspiration rates will make any drying of fuels and soils slow to occur. Potential problem areas are South Florida, which missed out of most of the tropical rainfall, and coastal areas of Georgia and South Carolina.

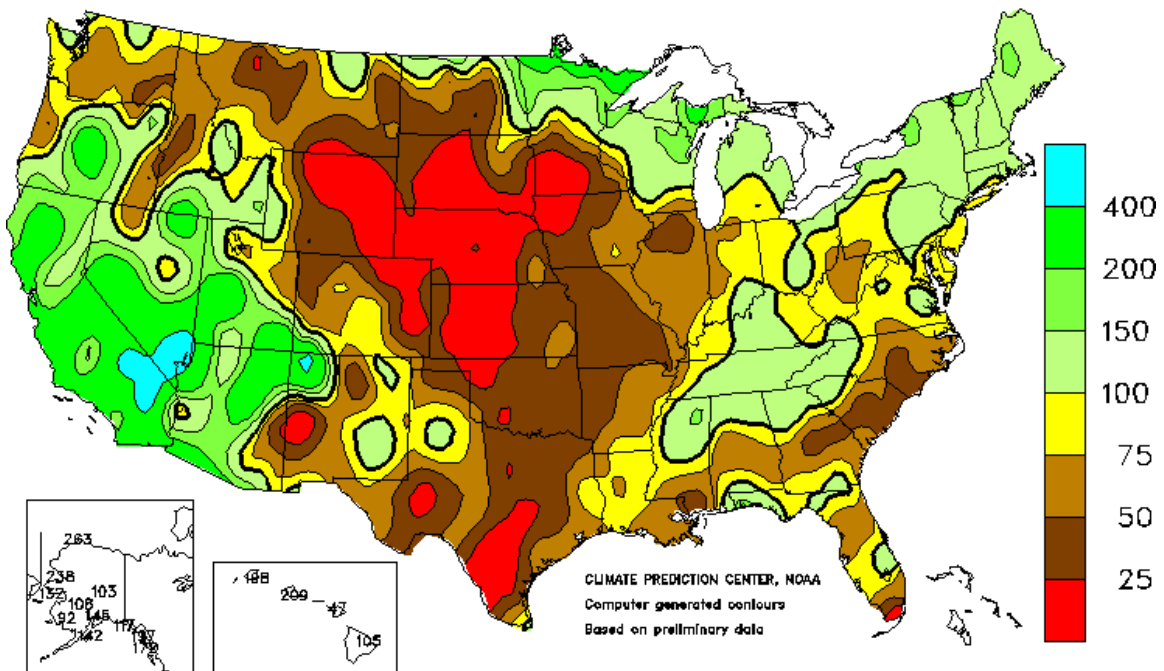
# Percent Of Normal Precipitation

SEP - NOV 2004



# Percent Of Normal Precipitation

December 2004



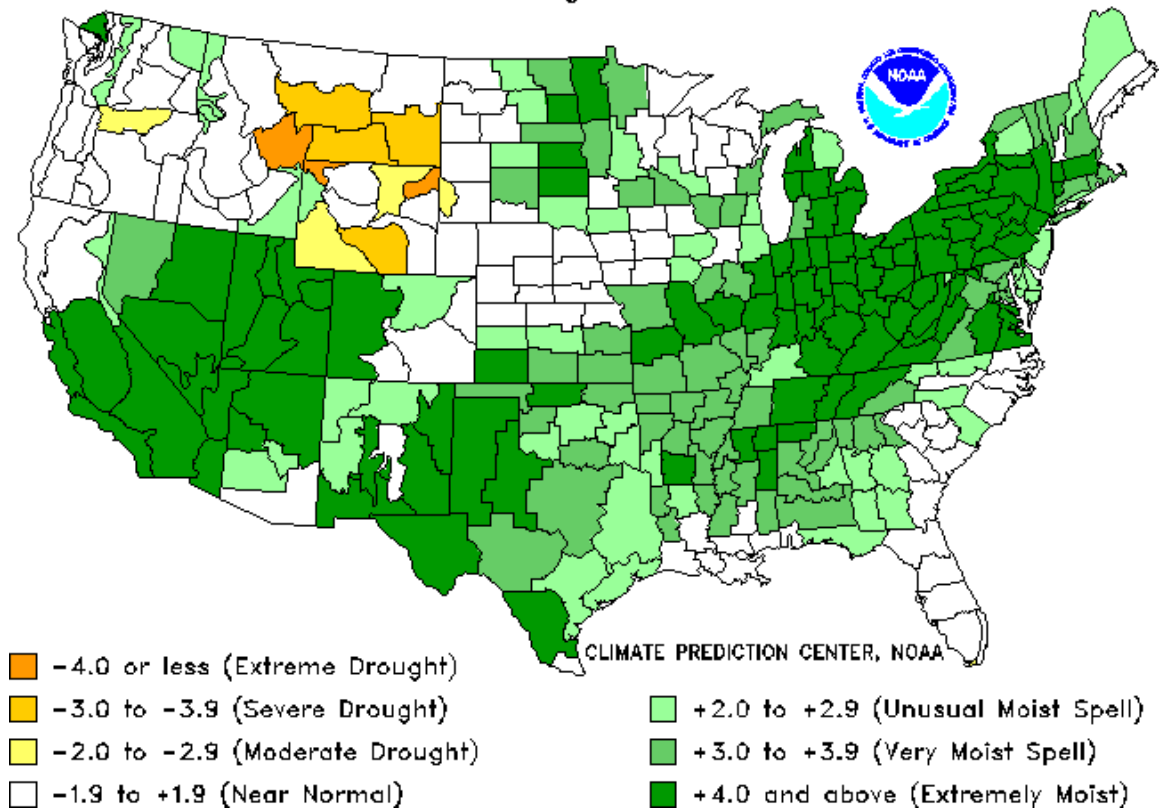
## ***Drought Indices***

Rather than looking at raw precipitation observations, various drought indices have been developed to track these observations as they pertain to all or part of the hydrologic cycle. Perhaps the best known drought index is the Palmer Drought Severity Index. The Palmer responds to rainfall surplus deficits on a mid- to long-range time scale and is most indicative of hydrologic concerns (deep soil moisture, surface water, groundwater). The most recent Palmer index is shown below and reflects the plentiful precipitation that the Southern region has enjoyed recently. All climate divisions have Palmer values ranging from near normal to extremely moist.

### **Drought Severity Index by Division**

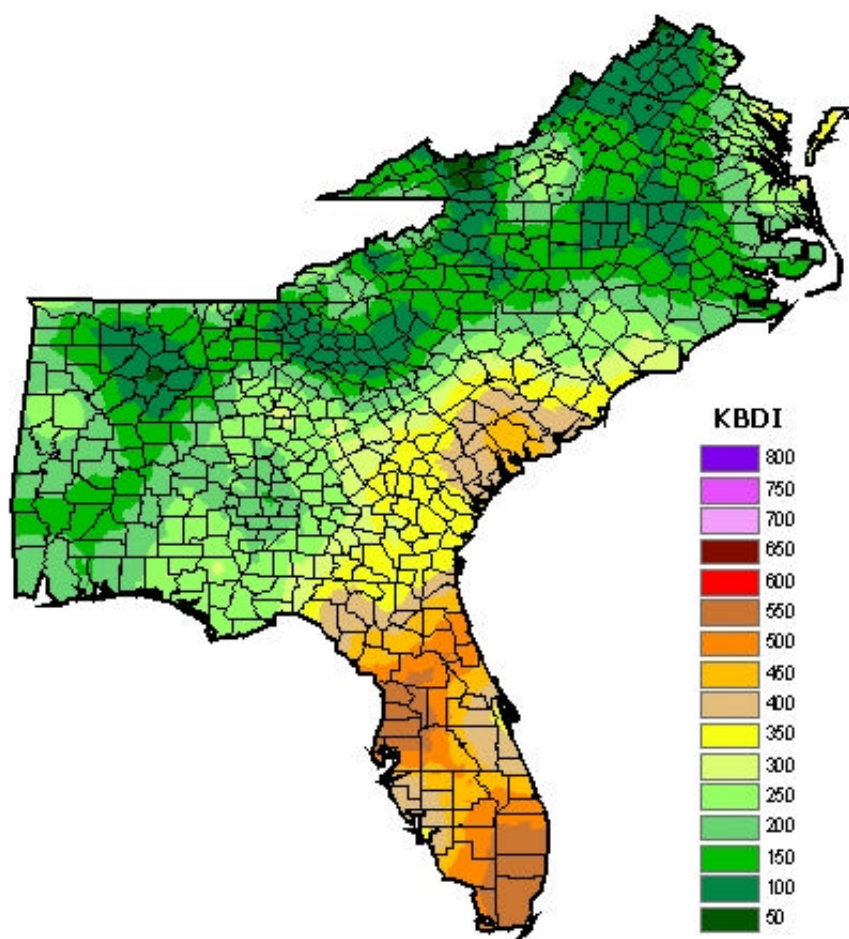
Weekly Value for Period Ending 15 JAN 2005

Long Term Palmer





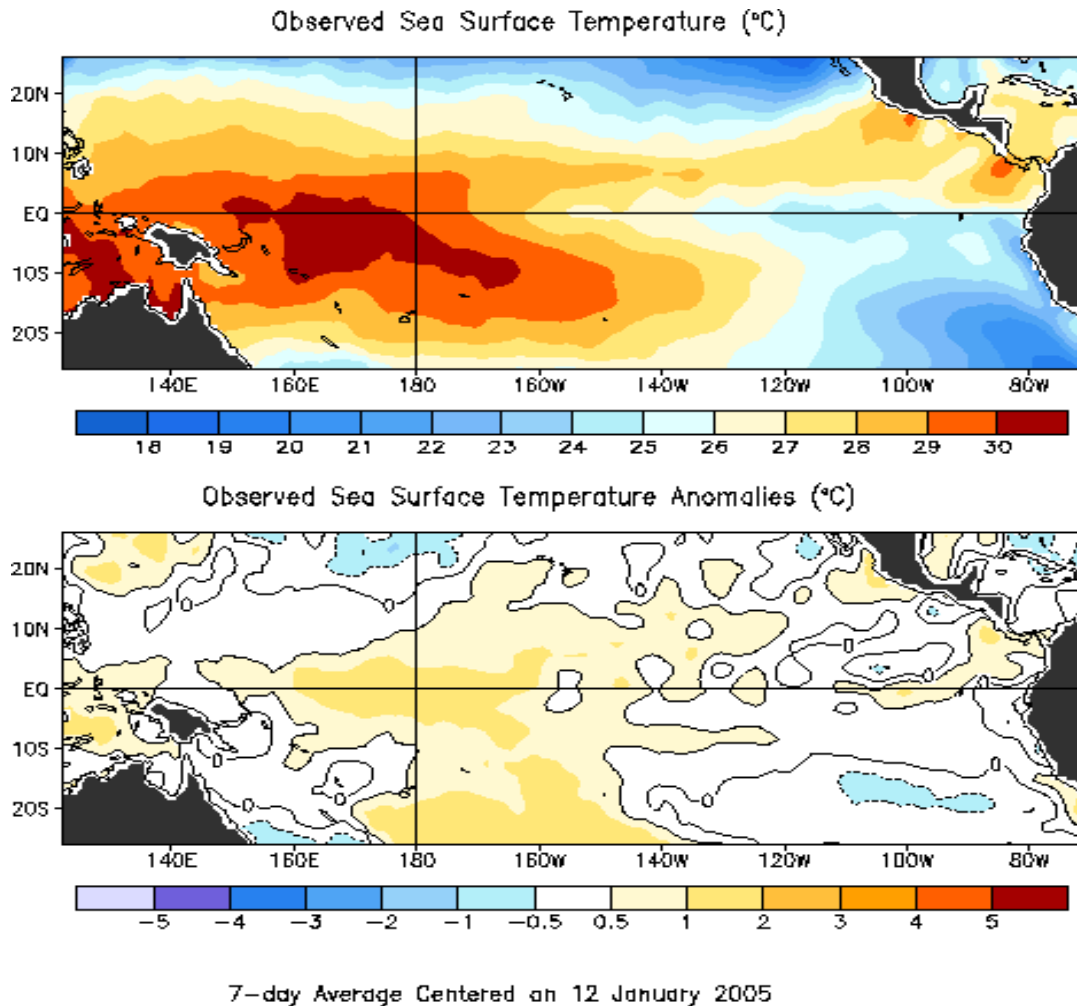
The most widely used drought index by forestry and wildfire sectors is the Keetch-Byrum Drought Index (KBDI), which is a surrogate for moisture in the upper layers of the soil. The KBDI responds much more quickly than the Palmer to recent weather, especially rainfall events. Shown below is the current KBDI analysis for part of the Southern Region. The excluded states are all quite moist and have no current moisture issues according to the KBDI. The map highlights the recent dryness in Florida, with values exceeding 500 and 550 in South Florida and the west coast north of Tampa. Winter and spring are the dry season for the peninsula and elevated KBDI values are to be expected. However, 500, 550 and above are on the high side of normal in South Florida and certainly indicate dryness further north. There is the potential for worsening conditions in this area as the dry season progresses and temperatures rise in the spring.



## **Ocean Temperatures and Climate Indices**

Climate shifts due to El Niño (warmer than normal sea surface temperatures in the tropical Pacific Ocean) and La Niña (cooler than normal) are well-known and are routinely used to predict seasonal temperature and precipitation trends as far as 6 to 9 months in advance. These climate shifts are particularly strong in Florida, the northern Gulf Coast, and the Southeast Atlantic Coast. During the winter months, El Niño brings plentiful rainfall (averaging 40% more than normal) to Florida and the Southeast and cooler temperatures. Conversely, La Niña is associated with warm and dry winter and spring seasons in the Southeast and can lead to wildfire seasons where acreage burned is at least double the average.

While there has been a degree of warming of sea surface temperatures in the central Pacific near the international date line in late summer and fall, the progress towards an El Niño has slowed and there has been no further eastward spread during the last several months. Ocean temperatures in the eastern Pacific near the coast of Peru (the traditional El Niño region) remain cool or close to normal. Cool upwelling remains strong and fishing is productive, opposite of the warmer waters and drastically reduced catches usually characteristic of an El Niño. Current sea surface temperatures and anomalies are shown in the figure below.



In addition, there has been no increase in thunderstorm activity over the affected area of the tropical Pacific. The warmer surface temperatures of El Niño usually cause increased convection (rain, clouds, and thunderstorms) over the central and eastern tropical Pacific and is the primary trigger for changes in the global circulation patterns. This increased convection has thus far failed to materialize.

Speaking of global circulation and changes to climate patterns, the recent flooding and storminess in California and the Western U.S. is not directly related to El Niño. The cause was a persistent blocking ridge/trough system over the Gulf of Alaska and the west coast and a weaker than normal jet stream across the central and eastern Pacific. While the resulting rainfall seems like business as usual for an El Niño, these features are inconsistent with the classic El Niño pattern.

While other climate indices and areas of the Pacific and Atlantic Oceans (PDO, NAO, AO, etc.) are known to influence the climate of North America, these are of secondary importance in the Southeast and their impacts are much weaker and less predictable than ENSO. These climate indices are not considered in the



consensus forecast presented in this assessment.

## **2. Fuel Conditions**

The current dead and live fuel moistures for much of the Southern Area are normal for this time of the year. However, there are pockets of slightly drier areas in the region such as the Southern tip of Florida and the coastal areas of Texas, plus Louisiana. Florida is currently the area of greatest concern for the current fire season. There are large amounts of increased fuel loadings due the hurricane damage in Florida and Alabama. Roughly 20 million acres were significantly affected in these two states. There are also pockets with increased fuel loading stretching from Florida westward to Mississippi, northward to the Appalachian Mountains (Virginia) due to blow down of southern pine beetle damaged areas. This blow down was caused by the four hurricanes (in 2004) as they made land fall during August and September.

The long range forecast for Florida indicates a slightly below normal level of precipitation during the upcoming fire season. This could lead to above normal fire potential for the state due to the increased fuel loading. The areas impacted by the hurricanes created large amounts of dead and downed material. This will not only impact fire behavior but also influence firefighting tactics. Fire behavior will likely be most influenced by an increase in fire line intensities and spotting. At the time of this report, Florida and South Texas is beginning the fire season. Frequency of precipitation is important in keeping fire potential in check. Any missed precipitation events will cause a significant increase in fire potential. This is especially important in these areas of increased fuel loading. If these areas go 10 to 14 days without measurable precipitation, fire behavior will be greatly increased.

The KBDI in south Florida and north central Florida is currently at the high side of normal. This is a concern because these values are occurring on the front end of the fire season with below normal precipitation expected for the remainder of the fire season. The Appalachian Mountains to the coastal plains in the Carolinas and the Texas gulf coast have slightly higher than normal ERC values. Also, in these areas the 1000hr dead fuel moisture values are running slightly below normal. It is important to note, the values in these areas are still moist. However, the values are trending toward the dry side for the start of fire season.

## **C. CLIMATE AND WEATHER OUTLOOKS**

### **1. Long Range Forecast**

Current conditions in the equatorial Pacific are reflecting weak warm to neutral phase of ENSO (neither El Niño nor La Niña) and these conditions are expected to continue throughout the assessment period. Weather conditions in parts of the southeast are strongly tied to ENSO; however, the neutral phase does not provide strong guidance for either above or below normal conditions.

Similar ENSO conditions existed last year (weakly warm sea surface temperature anomalies) when much of the region experienced normal to slightly below normal fire activity. Current conditions across the region are generally moister than this time last year. The exception to this is the peninsula of Florida, particularly south Florida. Without a strong signal indicating above normal precipitation, no strong recovery is expected and the probability for above normal temperatures in south Florida during the period will likely make conditions worse.

In the absence of a strong ENSO signal, weaker climate patterns begin to play a dominant role in southeastern climate, particularly the Pacific North American pattern (PNA) and North American Oscillation (NAO). The PNA establishes a pressure dipole between the Pacific Northwest and the Southeast with a positive PNA indicating lower than normal pressures in the southeast while the negative phase leads to higher pressure. For fire weather purposes, the negative PNA phase is the primary concern as the enhanced high pressure over the region limits rainfall and enhances deep layer atmospheric drying which is a potential mechanism for some isolated fire episodes.

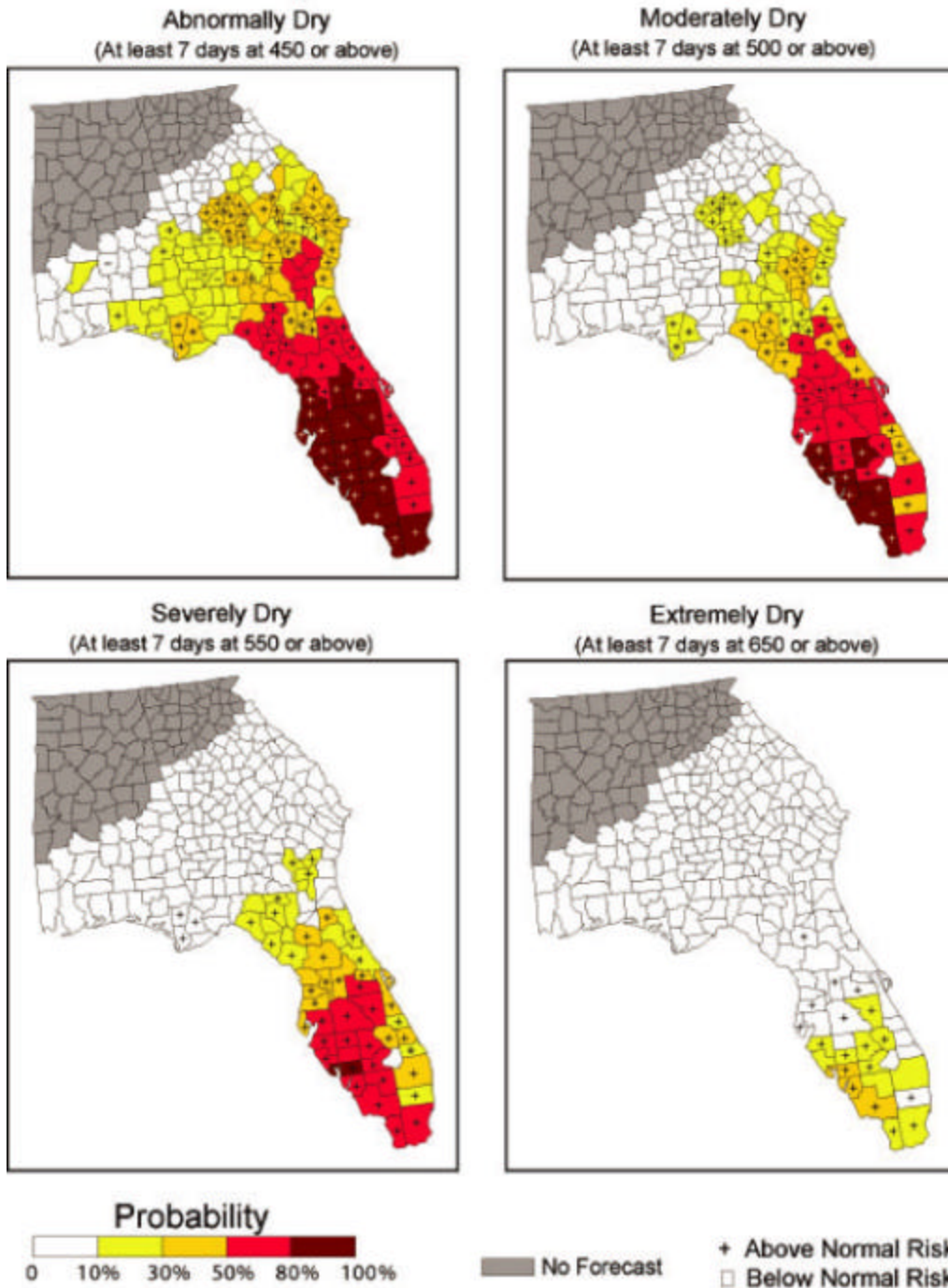
The NAO can also act to enhance high pressure in the southeastern United States in its positive phase. During March and April of last year both the PNA and NAO enhanced the high pressure ridge across the region, leading to an outbreak of fire activity in the southeast. These two indices vary over much shorter time scales than ENSO and therefore are difficult to predict on a seasonal basis. These indices should be monitored on a regular basis to help anticipate any short-term outbreaks this year.

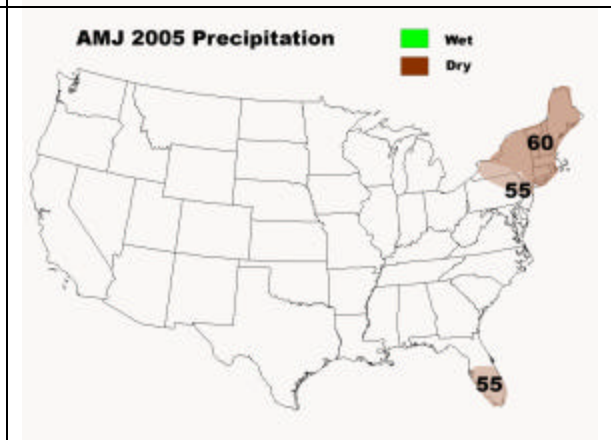
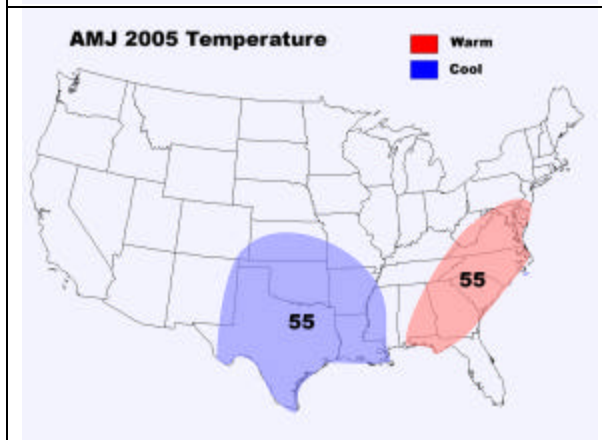
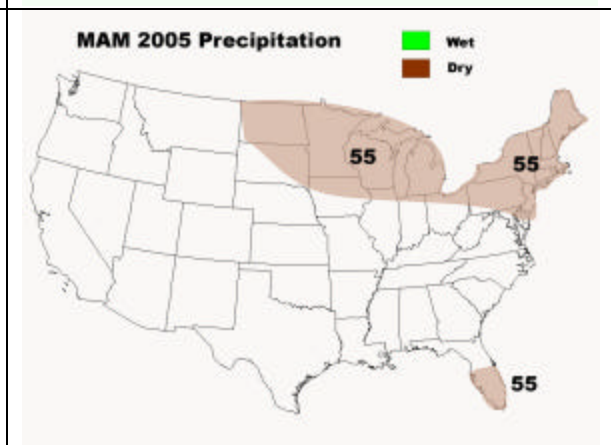
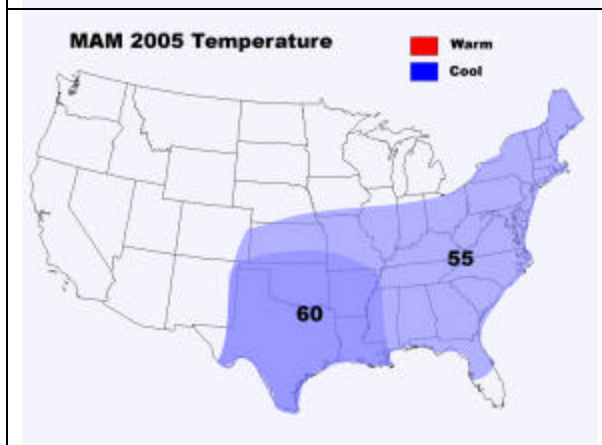
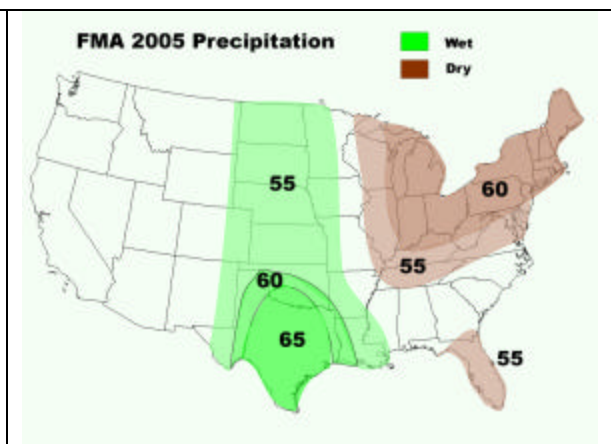
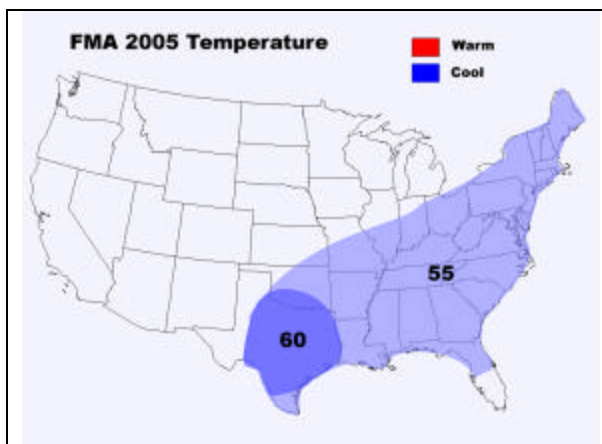
Florida is the primary area of concern. This area is currently drier than the rest of the southern region with no significant indicator pointing towards a significant wet period to provide substantial relief. An increased probability of above normal temperatures in the May June July period may lead to enhanced drying during this period and elevated fire risk. Florida State University's KBDI Potential Forecast indicates above normal potential for the KBDI to exceed 600 in southern Florida during May.

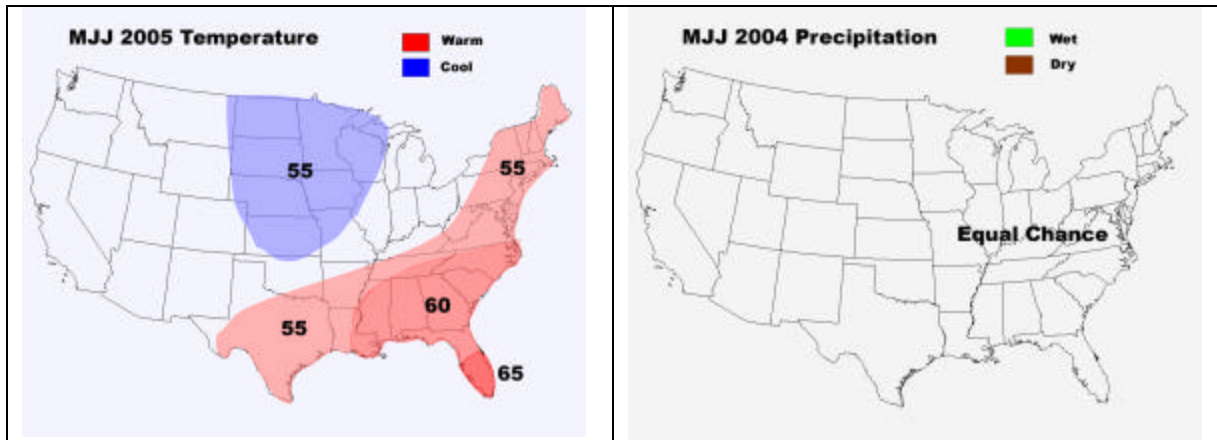
The outlook for the FMA and MAM periods indicate cooler than normal temperatures over most of the southern states with below normal precipitation likely to continue over south and central Florida. The temperature trend is toward warmer

than normal in the AMJ period with dryness continuing over south Florida in early months. There is no clear indication for moist or dry conditions to persist in the MJJ period over the Southeast suggesting the summer wet season will begin on time. Warmer than normal temperatures may be seen across the entire Southeast region with the highest increase over extreme South Florida.

## May 2005 KBDI Forecast

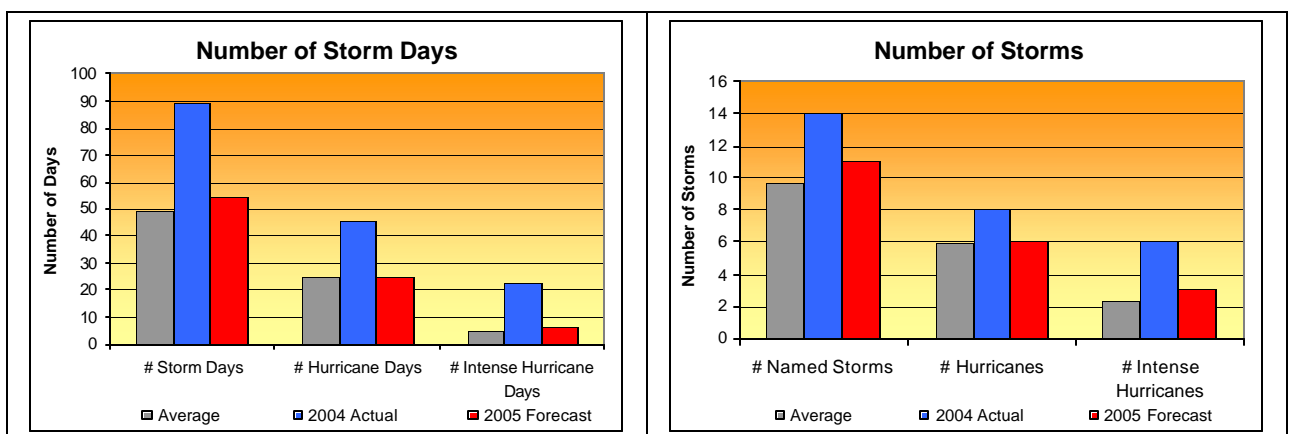






## 2. 2005 HURRICANE SEASON FORECAST

Last hurricane season was above average in activity and saw record number of hurricanes making landfall in the United States, with 4 landfalls in Florida alone. There were 6 intense hurricanes compared to a normal of 3. Net tropical cyclone activity was 228% of normal. Dr Gray's (Colorado State University) current forecast is calling for a slightly above average Tropical Storm Season (See chart below). Above average activity is expected for all forecast categories with the most significant anomalies expected for the number of tropical storm days (55 vs. average of 50). Net tropical cyclone activity is expected to be 115% of normal with an above average probability of United States landfall, but not a repeat of the number of land falling storms experienced in 2004. If this verifies with land falling storms, the higher activity levels could reduce the anticipated building of fire risk through the summer over more southern areas of the geographic area once again.



#### **D. FIRE OCCURRENCE AND RESOURCE OUTLOOKS.**

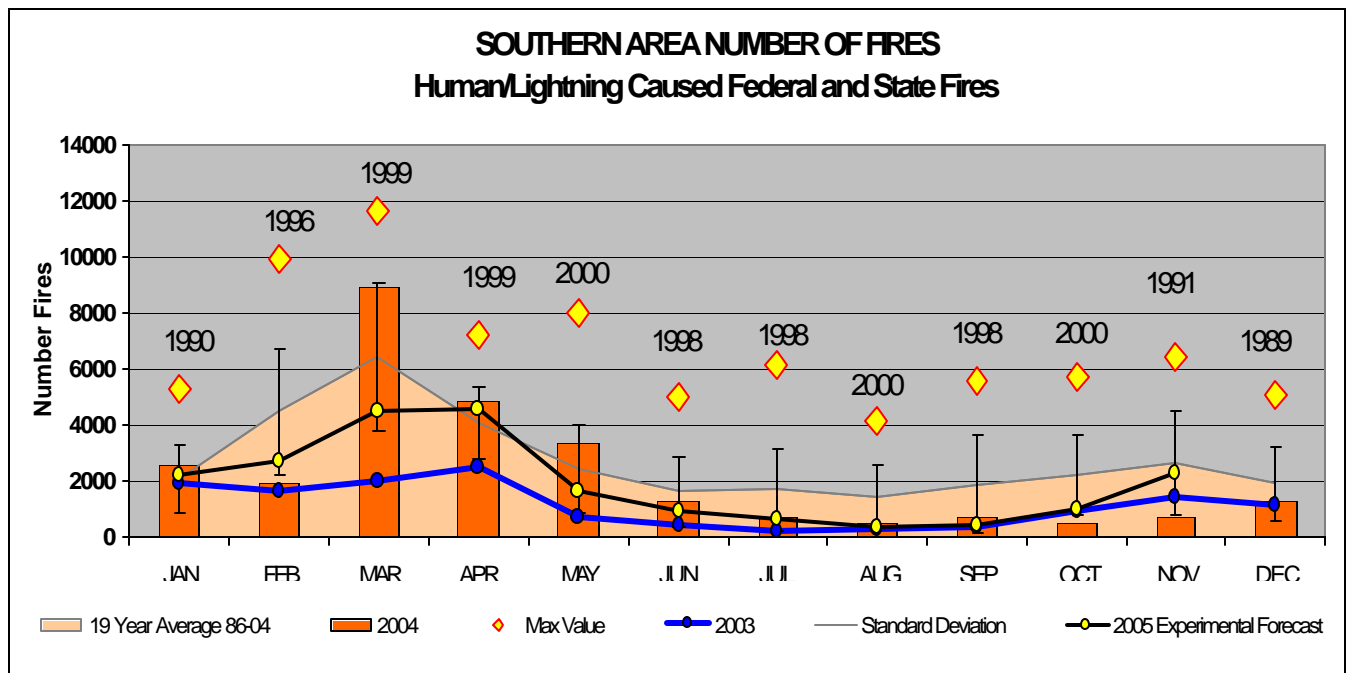
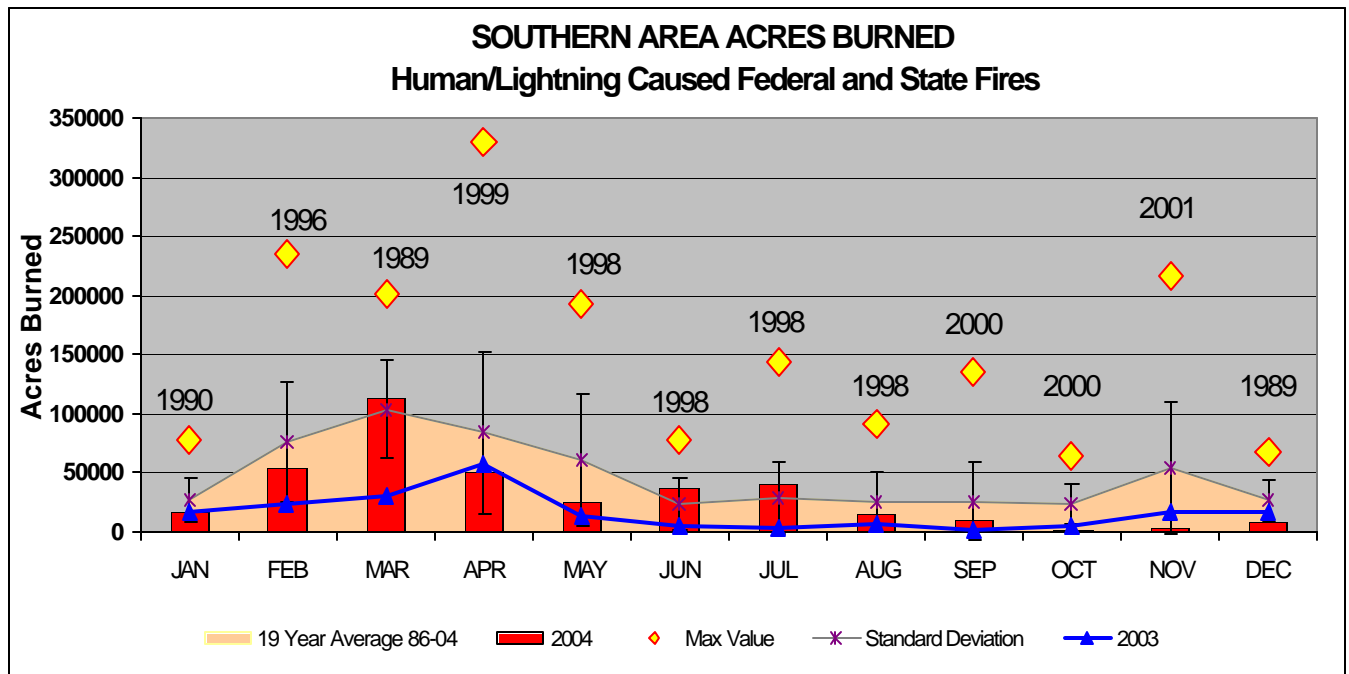
CY 2004 ended with the Southern Area having 83% normal fire occurrence and 67% of normal total acres. The Southern Area experienced a pick up in activity in March, especially in the coastal plain, but this ended about the third week of April. The remainder of 2004, including the "fall fire season" stayed below normal for all of the Southern Area. Based on the current climatology we expect that the fire activity for calendar year 2005 has the potential of increasing over last year due to the projected drying in South Florida. The fuels in South Florida are light and prone to rapid spread rates, which will lead to larger fires on average.

The primary fuels management concern in the Southern Area for the coming calendar year falls to Florida, Alabama and the Appalachian Mountains. The amount of hurricane debris from the 2004 storms will create a significant wildfire suppression problem. The concerns fall into three areas, they are:

1. The additional fuel will have the potential to ignite the organic fuels if any kind of drying occurs so there is an increased potential for organic soil fires (peat or muck fires).
2. The wildfires and prescribed burns in the "blow down" area will be more intense due to the increased fuels available to the fires resulting in increased lofting of larger fire brands outside the wildfire or prescribed fire perimeter. The potential for spot fires will increase, especially as humidities drop below 35%.

Wildfires will not spread any faster due to increased rates of spread in the storm damage areas. However, we expect that these fires will burn larger acreages due to access problems and increased spotting. Access is the primary concern at this time. The majority of the suppression units in Florida do not have the power to move through the downed hurricane debris. The additional concern here is for fire fighter safety. The ability to maneuver and the increased spotting potential can setup a situation where suppression crews can get "caught" without an escape route. Fires that occur in the areas where we have considerable downed debris will require heavier tractors (D-6/JD650 types or larger) in order to more safely maneuver. The outlook for CY 2005 is very positive. This would include across the board activities, mechanical, prescribed fire, and chemical.





## E. MANAGEMENT IMPLICATIONS AND CONCERNS

Management implications for the Region are anticipated to be routine in most of the Southern Area with the exception of those areas where the heavier fuel loads from the 2004 tropical storms (Florida, parts of Alabama and the Appalachian Mountains). These areas subject to the anticipated spring weather pattern can generate above normal fire intensities with mop-up requirements that will tax

local fire suppression resources. Heavier tractors will be required in the blow down areas, the lighter tractor/dozers will not be able to push through the heavier "jack-strawed" debris. Some concern has been noted for east and south Texas because of the precipitation deficit in December. The climate forecast has this area receiving above average moisture over the next 6 months, so this condition is not expected to continue. Exceptions have been noted for West Texas and North Carolina. North Carolina is being mentioned due to the increased fuel loading that has occurred in the state's Northeastern Coastal Plain counties (Hurricane Isabel) and the North Central Piedmont counties (January 2004 winter ice storm damage). These areas subject to the anticipated spring weather pattern can generate above normal fire intensities with mop-up requirements that will tax local fire suppression resources.

Another concern in these storm damage areas involves debris burning. For example, historically in Florida the largest cause of fires in January and February is debris burning. The increase in dead and down material will likely increase the number of people burning debris.

## F. SUMMARY AND RECOMMENDATIONS.

The Southern Area should generally have a normal fire season in 2005. However, there are significant areas of concern as outline previously. The frequency of rainfall patterns will be vitally important to maintain the areas with storm damage at a low fire potential level. If these areas miss one or two rainfall events, then fire intensity and spotting will increase. Once this occurs, fire activity may dictate the need for a response across the Southern Area. The heavy amount of down material may dictate the need to reassess traditional suppression tactics. Fuel and weather conditions should be closely monitored in these areas. Fire Managers should be aware of significant drying trends which could lead to increases in fire activity and behavior.

Scenario Description for the 2005 fire season	Southern Area Probability
<b>Most Likely Case</b> Dry pattern continues in Florida and fire activity will be normal to slightly above normal in FL and normal for the Southern Area	<b>80%</b>
<b>Best Case</b> Wet pattern begins--Minimal fire activity	<b>10%</b>
<b>Worst case</b> Large scale drying trend develops---Above normal fire activity across the Southern Area	<b>10%</b>